Circular Bulletin No. 12. Crop Pest Series No. 2

UNIVERSITY OF ARIZONA

Oregon Agricultural College
And Experiment Station

Three Species of Apple Plant Lice in Oregon

BY H. F. WILSON

The bulletins of the Oregon Agricultural College are sent free to all residents of Oregon who request them.

Series 1] Entered as second-class matter November 27, 1909, at the postoffice at Corvallis, Oregon, under the act of July 16, 1894. [No. 50

Digitized by the Internet Archive
in 2025

https://archive.org/details/extension-circular-oregon-state-extension-service_1911_12

Three Species of Apple Plant Lice in Oregon.

H. F. WILSON

While there may be a few other species of plant lice attacking the apple in Oregon, only the included species seem to be causing any serious damage. At least two of these are known to attack both the apple and the pear, and the same remedies will apply upon both kinds of trees.

Plant lice in general are small, soft-bodied, sucking insects found living on the leaves, and bark of trees, and on the stems and leaves of shrubs and herbaceous plants. Some species also attack the roots as well as those parts above ground.

Among fruit growers there is an erroneous idea that plant lice are limited to three or four species, and that those on willows, and many other plants are only forms of those on fruit trees. This idea, however, is not correct; and consequently the common belief that it is necessary to destroy willows and shrubs about or adjoining orchards as a means of preventing orchard infestation is not based upon facts.

All species of plant lice do not have the same habits or life history, and when we consider that there are perhaps 750 kinds attacking as many or more different kinds of plants, it would be necessary to destroy all plant life, if such means were to be used as a preventive.

Some species form and live within galls, while others cause the leaves of the plants upon which they live to curl; still others secrete waxy threads or filaments, all of which offer considerable protection to them, not only against their natural enemies, but also from the sprays and other destroying agents of mankind.

This group of insects, known as the Aphididae, is particularly interesting on account of the manner of reproduction and development of the different species.

Usually under natural conditions of the temperate zones the life history is as follows: The eggs are deposited in the Fall by sexual females; these eggs hatch the following Spring and produce the stem mothers, so-called from the fact that they are the first of each season's generations. Throughout the Summer successive generations of females are produced until in the Fall when the sexual forms are developed.

The Green Apple Aphis.

This species lives entirely upon the apple, pear, and related plants, and does not migrate to grasses, weeds, or vegetables, as does the following species. The eggs are deposited in the Fall upon the young shoots of the trees and the water sprouts, the latter being the favorite.

The eggs hatch the following Spring into very small green lice which are known as the stem mothers. Upon hatching they go to the tender buds where they feed and develope into mature forms. The Spring forms and all following generations of the Summer months are females which produce living young instead of laying eggs.

The first generation are all wingless, but later in the Spring many winged lice appear and these migrate to other trees where they start new colonies, mostly wingless.

During October and November the males and egg-laying females are produced, and the females lay the eggs which are to carry the insect through the Winter. When first laid the eggs are green but they soon change to shining black.

Appearance of the Adult.—The wingless females are light greenish in color, with black honey tubes and dusky antennae. The winged females, which are the migratory forms, are greenish in color with the head and wing bearing portion of the body black.

Remedies.

These are properly discussed under Winter or early Spring sprays, and Summer sprays.

Winter or Early Spring Sprays.—Lime and Sulfur used Winter strength (1-10 or 1-12) will undoubtedly kill many of the eggs, but to get the best results, this application should be made just as the buds are turning green. At that time most of the eggs will have hatched and the young are more easily killed than the eggs.

Black Leaf, diluted one gallon to forty gallons of the spray, may also be added, if the Lime-Sulfur does not seem entirely efficient, or can be diluted with water instead.

Summer Sprays.—No definite date or time can be given for these sprays, and the only recommendation which can be given is to spray when the lice become abundant.

Black Leaf.—Seems to be the most favored spray and when applied at this time 1-60 seems to be thoroughly efficient.

Black Leaf 40 which is a concentrated form of nicotine-sulfate, is now recommended in place of the Black Leaf.

Kerosene Emulsion.—Containing six to seven per cent oil is probably as efficient as Black Leaf and is cheaper, but needs more time and care in preparation. When used it should be properly made and thoroughly emulsified.

Since this species causes the leaves to curl and is protected by them, the best results are obtained by spraying early before the leaves curl badly, or, if later, the spray should be applied thoroughly and with considerable force to reach the lice.

The Brown Apple Aphis.

From observations and reports it would seem that next to the Woolly Aphis the Brown Apple Aphis is perhaps the most serious plant louse attacking the apple in Oregon.

This species not only feeds upon the leaves and new growth but also attacks the fruit spurs and fruit, the greatest damage being done to the spurs. Most of the attack, however, is confined to the inner portion of the tree.

Dr. Britton states that the eggs are smaller than those of the Green Apple Aphis, and one needs to hunt carefully in order to find them at all, as they are hidden around the buds, and sometimes partly under the scales. In Oregon, observations have led us to believe that the Brown Aphis sometimes lays numerous eggs on the young shoots among those of the Green Aphis, and that the eggs cannot be readily separated. The eggs of both species hatch at the same time in the Spring and the young can easily be separated before they have grown much. Hatching begins just before the buds open, the young lice crawl into the expanding buds and feed upon the blossoms and young fruit. These are the stem mothers and are wingless. Later generations become winged and migrate to some unknown Summer food plant, but not until very serious damage has been done to the fruit as well as the fruit spurs.

Appearance of the Adult Lice.—In the Spring both the winged and wingless forms are brownish red with a yellowish tinge. The winged forms, however, of both Spring and Fall have black heads and that portion of the body to which the wings are attached is also black. In the Fall both forms are rosy red with a greenish yellow tinge.

Remedies.—The same sprays which are applied for the Green Apple Aphis will also apply for this species.

The Woolly Apple Aphis.

This species is not ordinarily a leaf feeder, but may when abundant be found on the stems of the leaves and on young apples. The feeding in general is confined to the bark of the parts above ground or on the roots below the surface of the soil.

Appearance of the Louse.—At first glance a number of these lice feeding together in an old scar or wound, or on a young twig appear like a mass of moving cotton. Upon closer inspection this mass will be found to contain numerous individuals covered with a white waxy substance which takes the shape of threads, and which serves more or less as a protection to the louse, although they can be easily rubbed off thus exposing the purplish brown body to view. In each group, in the Fall of the year, winged individuals may be noticed; the wings appearing dusky, and projecting straight out from the cottony masses.

Life History of the Insect.—There is a wide difference between the life history of this and the preceding species in that some of the lice attack the roots as well as the upper portions of the tree.

Professor C. P. Gillette, of Colorado, has shown that in the Spring there may be four means of starting the Summer infestation. First, by the individuals which have lived over Winter on the parts above ground and hidden in old wounds or scars; second, by the early hatching of the stem mothers; third, by the numerous immature lice which may hibernate over Winter at the base of the tree and near the surface of the ground; fourth, by the over Winter half-grown individuals which spend the Winter on the roots and migrate upward in the Spring. These conditions are brought about in a very natural manner, and vary in different climates as the regular habit of the insect would be to produce eggs in the Fall as do other species of this family. Those individuals which are able to live over in the old scars and at the base of the trees are considerably protected from cold, as are also those about the roots. The root form probably instinctively seeks the roots both because of the protection from enemies and because of the better feeding conditions.

The lice which appear in the Spring and through the Summer are all wingless, and the winged forms do not appear again until in the Fall.

Anyone who has observed badly injured trees can hardly fail to see that the many knots or swellings formed on roots, trunk, and limbs are not natural, and that the vitality of the tree must be greatly reduced. The root injury is perhaps the most serious as they often die and become decayed, thus weakening the support of the tree and partially cutting off the food supply.

Remedies.—These should begin with a thorough inspection of the nursery stock when it is received; any clods or dirt hanging to the roots should be washed off, and if any lice are found either on the roots or top, the stock should be thoroughly sprayed with, or dipped into, Lime-Sulfur 1-10, or Black-Leaf 1-60.

On parts attacked above ground, any spray which will kill other plant lice will also destroy this species. The spray must be applied with force enough to penetrate or wash off the white waxy secretion.

On parts attacked below ground the sprays as used above ground will be efficient, but before they can be applied the infested roots must be exposed so that the spray can be made to reach the lice. According to C. P. Gillette, of Colorado, the roots are not ordinarily infested more than six inches below ground and about two feet out from the tree.

How to Prepare Sprays.

Lime-Sulfur.—Since every orchardist should be fully acquainted with the method of preparation and the use of this spray, it is probably not necessary to give additional notes here.

Black-Leaf.—This is a commercial spray sold under patent by the Kentucky Tobacco Product Company, Louisville, Kentucky.

Kerosene Emulsion.—This is usually prepared as a stock solution and then diluted to the required strength for spraying. The necessary materials are as follows:

Hard soap	½ pound
Water	1 gallon
Kerosene	2 gallons

The soap should be dissolved in boiling water, and when thoroughly dissolved the containing vessel should be removed from the fire and the kerosene added. The mixture should be then thoroughly agitated until it is creamy white. This is best done by a hand-pump, forcing the mixture through the hose and back into the container. This then forms three gallons of stock solution which can

be diluted to the required strength by adding given amounts of water. To get the amount for any given percentage, divide the percentage into two-hundred and then subtract three from the answer, and we have the amount of water necessary to add to each three gallons of stock solution for that percent.

Example: We desire a 15%, 20%, and 7% solution.

15)200

$13\frac{1}{3}-3=10\frac{1}{3}$ gallons of water to be added to three gallons of stock solution to get a 15% solution.

20)200

10—3=7 gallons of water to be added to three gallons of stock solution to get a 20% solution.

7)200

$28\frac{1}{2}-3=25\frac{1}{2}$ gallons of water to be added to three gallons of stock solution to get a 7% solution.